

**PURWANCHAL UNIVERSITY**  
**VII SEMESTER FINAL EXAMINATION-2004**

**LEVEL :** B. E. (Civil)

**SUBJECT:** BEG465CI, Irrigation Engineering.

**TIME:** 03:00 hrs

**Full Marks:** 80

**Pass marks:** 32

*Candidates are required to give their answers in their own words as far as practicable.*

*All questions carry equal marks. The marks allotted for each sub-question is specified along its side.*

**Attempt any FIVE questions.**

- Q. [1] [a] Differentiate between permeable and impermeable groynes. [4]  
[b] How is irrigation water allocated (basis of allocation) to crops and lands? How the benefit in terms of safety can be obtained from irrigation? [6]  
[c] If barley requires 18cm of water after 30 days and the base period of barley is times that of wheat, find the duty of water for barley. The base period of wheat is 125 days. [6]
- Q. [2] [a] How will you justify the economics of canal lining? [6]  
[b] Find using Khosla's theory, the total length of floor of a Canal Head Regulator for the design flow of 35 m<sup>3</sup>/s. Overall waterway width=35m, Maximum Seepage Head=7.85m, Depth of D/S Sheet Pile

below Floor=6.65m, Safe Exit Gradient  $G_E=1/6$  and Silt Factor (f)=1.25. [10]

- Q. [3] [a] What are factors affecting crop water requirements? [4]  
[b] Design a lined canal to carry a discharge of 75cumec. The canal has a bed slope of 1:3500 and side slope of 1V:75H. Manning's rugosity coefficient of lined canal=0.015. [12]
- Q. [4] [a] How will you carry out hill irrigation system planning and management? [4]  
[b] Design a canal fall for the following data. Assume suitable data if necessary: [12]  
[i] Design width of canal= 3.5m,  
[ii] Drop height= 1.5m,  
[iii] Discharge= 4.5m<sup>3</sup>/s  
[iv] Bed slope of canal= 1:2000  
[v] Side slope of canal= 1:1
- Q. [5] [a] What are systems of irrigation that coexist in Nepal? How can you determine the discharge for external drainage system? [3+5]  
[b] An irrigation canal in western region of Nepal was designed as per the given data:  
Critical velocity ratio= 1.35. Bed width= 5.25m, Side slopes= 45° and Freeboard= 1.25m.
- What would be the canal flow discharge capacity at the flow depth of 1.65m and by what percentage its discharge would be increased if the depth of How reaches to 2.25m? [8]

Q. [6] [a] What are the purposes of river training works?

How water logging can be avoided? [3+3]

[b] Determine the depth and frequency of irrigation for maize crop with given data: [10]

[i] Field Capacity = 28%

[ii] Permanent Wilting point 13%

[iii] Root zone depth = 105cm

[iv] Specific gravity of soil = 1.65

[v] Consumptive use of water = 32mm/day

[vi] Efficiency of irrigation = 62%

Assume 30% depletion on available moisture before application of irrigation water at field capacity.

**PURWANCHAL UNIVERSITY**  
**VII SEMESTER FINAL EXAMINATION-2005**

**LEVEL : B. E. (Civil)**

**SUBJECT: BEG465CI, Irrigation Engineering.**

**TIME: 03:00 hrs**

**Full Marks: 80**

**Pass marks: 32**

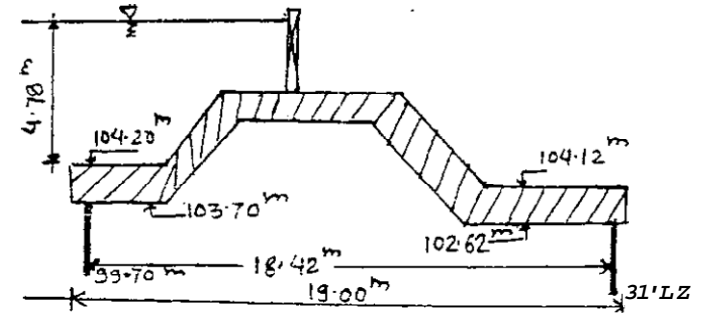
*Candidates are required to give their answers in their own words as far as practicable.*

*All questions carry equal marks. The marks allotted for each sub-question is specified along its side.*

**Attempt any FIVE questions.**

- Q. [1] [a] What do you understand by term irrigation? List out the necessity of irrigation in a tropical country like Nepal. [8]  
 [b] Explain briefly about the development of irrigation in our country. [8]
- Q. [2] [a] What do you understand by the term 'Canal Alignment'? Explain with a neat sketch. [8]  
 [b] Explain the term duty and delta. Derive the relationship between the two. [8]
- Q. [3] [a] Design a trapezoidal lined Canal for discharge=350 cumecs,  $S=1$  in 5000 [12]  
 Side Slope =  $(32.5^\circ$  to the verticle),  $n = 0.014$ .  
 Limiting velocity of channel =2m/sec.  
 [b] Draw a neat sketch of a typical X-section of canal in fully cutting area. [4]
- Q. [4] Determine the % pressure at the key points and the exit gradient and check the given structure is

safe or not from piping action. Permissible exit gradient=  $1/6$ . [16]



- Q. [5] [a] What are the specific design criteria for hilly irrigation canals? [4]  
 [b] Design a distributary's head regulator for following data: [12]  
 Discharge of dist. Canal= 15m<sup>3</sup>/sec  
 F.S.L of parent channel= 218.10m  
 Depth of water in parent channel= 2.5m  
 F.S. L of distribution= 217.10m  
 Bed Width of distributary= 15.0m  
 Depth of water in distributary= 1.5m  
 Permissible exit gradient=  $1/5$
- Q. [6] [a] Explain about the operation and maintenance of irrigation systems. [8]  
 [b] What are the causes and ill effects of water logging? What are the preventive measures? [8]

[b] The head regulator of a canal has 3 opening each 3 m wide. The water is flowing between the upper and lower gates. The vertical opening of the gate

is 1.0 m. The head regulator is 0.45 m (Afflux). If the upstream water level rises by 0.20 m. find how much the upper gates must be lowered to maintain the canal discharge unaltered. [8]

Q. [6] [a] What are the major causes and ill effects of water logging? Suggest the preventive majors for avoiding land from water logging. [8]

[b] Design and sketch the Bell's Bund from following hydraulic data pertains to a bridge site for a river.[8]  
Maximum discharge - 6000 cumecs,  
Highest flood level = 120.00 m,  
River bed level = 116.00  
Average diameter of river bed material = 0.10 m